UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/674,364	09/29/2003	Michael Y. Lai	42P16116	5221

8791 7590 11/01/2006

BLAKELY SOKOLOFF TAYLOR & ZAFMAN
12400 WILSHIRE BOULEVARD
SEVENTH FLOOR
LOS ANGELES, CA 90025-1030

EXAMINER	
TECKLU, ISAAC TUKU	

ART UNIT	PAPER NUMBER
2192	

DATE MAILED: 11/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/674,364	LAI, MICHAEL Y.	
	Examiner	Art Unit	
	Isaac T. Tecklu	2192	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-57* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-57* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is responsive to the application filed on 09/29/2003.

2. Claims 1-57 have been examined.

Oath/Declaration

3. The office acknowledges receipt of a properly signed oath/declaration filed on 02/09/2004.

Claim Objections

4. Claims 3-4, 25-26 and 47 recite acronym "def/use", such abbreviation should be spelled out once in the claims as its intended meaning and utility will be changed over time. Appropriate correction is required.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 45-57 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 45 is non-statutory as being "A compiler" with out being supported by hardware such as tangible computer storage or execution engine, which would enable one skill in the art to construe that the compiler is built from tangible product to carry out any functionality being conveyed from the claim. Thus, the compiler is software *per se* and therefore is not being tangibly embodied in a manner as to be executable.

Under the Interim Guidelines Section IV (a) data structures and/or program per se not claimed as embodied in computer-readable media are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer. See, e.g., Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory). Such claimed data structures do not define any structural and functional

interrelationships between the data structure and other claimed aspects of the invention which permit the data structure's functionality to be realized. In contrast, a claimed computer-readable medium encoded with a data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized, and is thus statutory.

Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility (signed 26 October 2005) – OG Cite: 1300 OG 142.

〈http://www.uspto.gov/web/offices/com/sol/og/2005/week47/patgupa.htm〉

Claims 46-57 are rejected for failing to cure the deficiencies of the above rejected non-statutory claim 45 above.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-57 are rejected under 35 U.S.C. 102(b) as being anticipated by Tye et al. (US 6,226,789 B1).

As per claim 1, Tye discloses a method comprising:

generating an intermediate representation (IR) of a source program (e.g. FIG. 65B, element 884 "SOURCE INSTRUCTIONS " and related text), where the source program includes one or more instructions for processing data in a bit field within a data structure (col. 63, 15-20 "... builds an Intermediate representation (IR) ...");

modifying the intermediate representation to more efficiently execute the one or more instructions for processing the bit field data (col. 63, 15-30 "... then modifies IR..."); and

generating resultant code based on the modified intermediate representation (col. 63, 15-35 "... resulting instruction ... binary image ...").

As per claim 2, Tye discloses the method of claim 1, wherein modifying the intermediate representation further comprises: pre-processing the IR to perform preliminary modification of the IR (col. 2, 5-15 "... preprocessor to convert ...") and e.g. FIG. 62C and related text).

As per claim 3, Tye discloses the method of claim 2, wherein modifying performing pre-processing further comprises:

performing data flow analysis to gather information regarding definition and usage of the bit field data (col. 1, 55-60 "... data flow analysis ..." and e.g. FIG. 57 and related text.); and generating a def/use graph to classify the information (col. 1, 55-60 "... graph representation ...").

As per claim 4, Tye discloses the method of claim 3, wherein generating a def/use graph further comprises:

generating a def/use graph to classify the information in relation to an associated packet (col. 3, 55-60 "... data flow analysis ...").

As per claim 5, Tye discloses the method of claim 2, wherein modifying the intermediate representation further comprises: (a) allocating a temporary variable to hold the bit field data (e.g. FIG. 23 and related text); and (b) modifying the IR so that the temporary variable is processed in accordance with the instructions (col. 63, 15-30 " ... then modifies ...").

As per claim 6, Tye discloses the method of claim 5, further comprising: (c) assigning the value of the temporary variable to a memory (e.g. FIG. 47 and related text).

As per claim 7, Tye discloses the method of claim 6, further comprising: performing steps (a), (b) and (c) for a single basic block (e.g. FIG. 47 and related text).

As per claim 8, Tye discloses the method of claim 7, further comprising: identifying two or more sub-blocks within the basic block (col. 65, 20-30 "... basic bloc ..." and e.g. FIG. 47 and 48 and related text).

As per claim 9, Tye discloses the method of claim 8, wherein: steps (a), (b) and (c) are performed for each sub-block (e.g. FIG. 47 and related text).

As per claim 10, Tye discloses the method of claim 5, further comprising: determining whether all of the one or more instructions for processing the bit field data are read-after-write instructions; and performing steps (a) and (b) only if the determination is false (col. 47, 40-45 "... read write ...").

As per claim 11, Tye discloses the method of claim 6, further comprising: determining whether any of the one or more instructions for processing the bit field data are write instructions; and performing step (c) only if the determination is true (e.g. FIG. 49 and related text).

As per claim 12, Tye discloses the method of claim 6, further comprising: removing the modifications effected by steps (a), (b) and (c) upon determining that such removal is expected to provide an efficiency benefit in the resultant code (e.g. FIG. 62A, element 836 and related text).

As per claim 13, Tye discloses the method of claim 2, wherein pre-processing further comprises: disambiguating a memory reference to the bit field (e.g. FIG. 62B, element 844 and related text).

As per claim 14, Tye discloses the method of claim 1, wherein modifying the intermediate representation further comprises: modifying the IR so that multiple instructions to initialize respective bit fields of a data structure are performed with a single write to a memory (col. 63, 15-30 "... then modifies IR...").

As per claim 15, Tye discloses the method of claim 14, wherein the multiple instructions occur within a pre-defined maximal scope (e.g. FIG. 62B and related text).

As per claim 16, Tye discloses the method of claim 1, wherein modifying the intermediate representation further comprises: modifying the IR so that multiple read instructions for respective bit fields of a data structure are performed with a single read from a memory (col. 63, 15-30 "... then modifies IR...").

As per claim 17, Tye discloses the method of claim 16, wherein the multiple read instructions occur within a pre-defined maximal scope (e.g. FIG. 62B and related text).

As per claim 18, Tye discloses the method of claim 1, wherein modifying the intermediate representation further comprises: modifying the IR so that multiple write instructions to respective bit fields of a data structure are performed with a single write to a memory (col. 63, 15-30 "... then modifies IR...").

As per claim 19, Tye discloses the method of claim 18, wherein the multiple read instructions occur within a pre-defined maximal scope (e.g. FIG. 62B and related text).

As per claim 20, Tye discloses the method of claim 1, wherein modifying the intermediate representation further comprises:

determining that a first instruction, being one of the one or more instructions, indicates a bit-wise logical operation on the bit field data (e.g. FIG. 65A, element 874 and related text);

determining that a second instruction of the source program indicates a bit-wise logical operation on a second bit field within the data structure (e.g. FIG. 65A, element 876 and related text); and

modifying the IR so that the first and second instructions are performed via a single read from a memory (e.g. FIG. 65A, element 880 and related text).

As per claim 21, Tye discloses the method of claim 20, wherein the bit-wise logical operation is a bit-wise OR operation (e.g. FIG. 42 and related text).

As per claim 22, Tye discloses the method of claim 20, wherein the bit-wise logical operation is a bit-wise AND operation (e.g. FIG. 42A and related text).

As per claim 23, this is the article version of the claimed method discussed above (Claim 1), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 24, this is the article version of the claimed method discussed above (Claim 2), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 25, this is the article version of the claimed method discussed above (Claim 3), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 26, this is the article version of the claimed method discussed above (Claim 4), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 27, this is the article version of the claimed method discussed above (Claim 5), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 28, this is the article version of the claimed method discussed above (Claim 6), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 29, this is the article version of the claimed method discussed above (Claim 7), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 30, this is the article version of the claimed method discussed above (Claim 8), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 31, this is the article version of the claimed method discussed above (Claim 9), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 32, this is the article version of the claimed method discussed above (Claim 10), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 33, this is the article version of the claimed method discussed above (Claim 11), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 34, this is the article version of the claimed method discussed above (Claim 12), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 35, this is the article version of the claimed method discussed above (Claim 13), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 36, this is the article version of the claimed method discussed above (Claim 14), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 37, this is the article version of the claimed method discussed above (Claim 15), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 38, this is the article version of the claimed method discussed above (Claim 16), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 39, this is the article version of the claimed method discussed above (Claim 17), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 40, this is the article version of the claimed method discussed above (Claim 18), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 41, this is the article version of the claimed method discussed above (Claim 19), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 42, this is the article version of the claimed method discussed above (Claim 20), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 43, this is the article version of the claimed method discussed above (Claim 21), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 44, this is the article version of the claimed method discussed above (Claim 22), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 45, this is the compiler version of the claimed method discussed above (Claim 1), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 46, this is the compiler version of the claimed method discussed above (Claim 2), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 47, this is the compiler version of the claimed method discussed above (Claim 3), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 48, this is the compiler version of the claimed method discussed above (Claim 5), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 49, this is the compiler version of the claimed method discussed above (Claim 6), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 50, this is the compiler version of the claimed method discussed above (Claim 14), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 51, this is the compiler version of the claimed method discussed above (Claim 15), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 52, this is the compiler version of the claimed method discussed above (Claim 17), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 53, this is the compiler version of the claimed method discussed above (Claim 19), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 54, this is the compiler version of the claimed method discussed above (Claim 20), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 55, this is the compiler version of the claimed method discussed above (Claim 21), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 56, this is the compiler version of the claimed method discussed above (Claim 21), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

As per claim 57, this is the compiler version of the claimed method discussed above (Claim 21), wherein all claim limitations have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also anticipated by Tye.

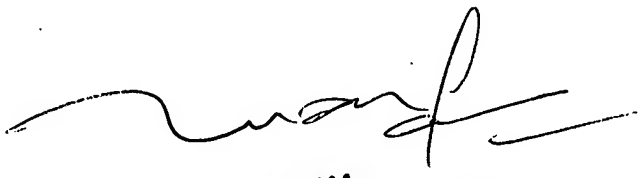
Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Isaac T. Tecklu whose telephone number is (571) 272-7957. The examiner can normally be reached on M-TH 9:300A - 8:00P.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Isaac Tecklu
Art Unit 2192



TUAN DAM
SUPERVISORY PATENT EXAMINER